

BLP8G10S-45P; BLP8G10S-45PG

Power LDMOS transistor

Rev. 3 — 8 January 2016

AMMPLÉON

Product data sheet

1. Product profile

1.1 General description

The BLP8G10S-45P and BLP8G10S-45PG are dual path, 45 W LDMOS power transistors for base station applications at frequencies from 700 MHz to 1000 MHz.

Table 1. Application performance

Typical RF performance at $T_{case} = 25\text{ °C}$; $I_{Dq} = 224\text{ mA}$ in common source class-AB production circuit.

| Test signal | f | V _{DS} | P _{L(AV)} | G _p | η _D | ACPR |
|------------------|-------|-----------------|--------------------|----------------|----------------|-------------------------|
| | (MHz) | (V) | (W) | (dB) | (%) | (dBc) |
| 2-carrier W-CDMA | 960 | 28 | 2.5 | 20.8 | 19.8 | -49 [1] |

[1] Test signal: 3GPP; test model 1; 64 DPCH; PAR = 8.4 dB at 0.01% probability on CCDF; carrier spacing = 5 MHz; per section unless otherwise specified.

1.2 Features and benefits

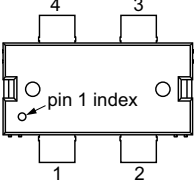
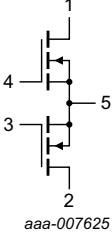
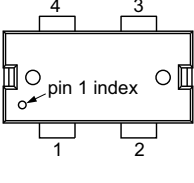
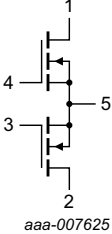
- High efficiency
- Excellent ruggedness
- Designed for broadband operation (700 MHz to 1000 MHz)
- Excellent thermal stability
- High power gain
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- W-CDMA
- LTE
- GSM

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|----------------------------------|----------------------------|---|--|
| BLP8G10S-45P (SOT1223-2) | | | |
| 1 | drain 1 |  |  aaa-007625 |
| 2 | drain 2 | | |
| 3 | gate 2 | | |
| 4 | gate 1 | | |
| 5 | source [1] | | |
| BLP8G10S-45PG (SOT1224-2) | | | |
| 1 | drain 1 |  |  aaa-007625 |
| 2 | drain 2 | | |
| 3 | gate 2 | | |
| 4 | gate 1 | | |
| 5 | source [1] | | |

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|---------------|---------|---|-----------|
| | Name | Description | Version |
| BLP8G10S-45P | HSOP4F | plastic, heatsink small outline package; 4 leads (flat) | SOT1223-2 |
| BLP8G10S-45PG | HSOP4 | plastic, heatsink small outline package; 4 leads | SOT1224-2 |

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Min | Max | Unit |
|------------|--|------|------|------|
| V_{DS} | drain-source voltage | - | 65 | V |
| V_{GS} | gate-source voltage | -0.5 | +13 | V |
| T_{stg} | storage temperature | -65 | +150 | °C |
| T_j | junction temperature [1] | - | 225 | °C |
| T_{case} | case temperature [1] | - | 150 | °C |

[1] Continuous use at maximum temperature will affect the reliability.

5. Thermal characteristics

Table 5. Thermal characteristics

Values specified for entire device.

| Symbol | Parameter | Conditions | Typ | Unit |
|------------------|--|---|------|------|
| $R_{th(j-case)}$ | thermal resistance from junction to case | $T_{case} = 85\text{ °C}; P_L = 5\text{ W}$ | 0.85 | K/W |

6. Characteristics

Table 6. DC characteristics

$T_{case} = 25\text{ °C}$; per section unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|----------------------------------|---|-----|-----|-----|------------------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0\text{ V}; I_D = 0.4\text{ mA}$ | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS} = 10\text{ V}; I_D = 40\text{ mA}$ | 1.5 | 1.9 | 2.3 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$ | - | - | 1.4 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$ | - | 7.3 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 140 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}; I_D = 2\text{ A}$ | - | 3.0 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{DS} = 10\text{ V}; I_D = 1.4\text{ A}; V_{GS} = V_{GS(th)} + 3.75\text{ V}$ | - | 500 | - | $\text{m}\Omega$ |

Table 7. RF characteristics

Test signal: 2-carrier W-CDMA; PAR 8.4 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 DPCH; $f_1 = 952.5\text{ MHz}; f_2 = 957.5\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 224\text{ mA}$; $T_{case} = 25\text{ °C}$; per section in a class-AB production circuit unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|------------------------------|----------------------|-----|------|-----|------|
| G_p | power gain | $P_L = 2.5\text{ W}$ | 20 | 20.8 | - | dB |
| RL_{in} | input return loss | $P_L = 2.5\text{ W}$ | - | -18 | -9 | dB |
| η_D | drain efficiency | $P_L = 2.5\text{ W}$ | 18 | 19.8 | - | % |
| ACPR | adjacent channel power ratio | $P_L = 2.5\text{ W}$ | - | -49 | -43 | dBc |

7. Test information

7.1 Ruggedness in class-AB operation

The BLP8G10S-45P and BLP8G10S-45PG are capable of withstanding a load mismatch corresponding to $VSWR = 10 : 1$ through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 224\text{ mA}; P_L = 25\text{ W}; f = 728\text{ MHz}$.

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data. Typical values per section unless otherwise specified.

| f (MHz) | Z _S [1] (Ω) | Z _L [1][2] (Ω) |
|----------------------|---------------------------|------------------------------|
| BLP8G10S-45P | | |
| 720 | 11.6 – j12.9 | 5.44 + j6.34 |
| 746 | 14.8 – j9.2 | 4.51 + j6.03 |
| 757 | 15.3 – j4.6 | 4.23 + j6.15 |
| 791 | 13.3 – j1.6 | 3.99 + j5.62 |
| 820 | 6.5 – j1.1 | 3.87 + j5.37 |
| 869 | 5.2 – j2.4 | 4.25 + j4.49 |
| 894 | 4.4 – j3.0 | 3.69 + j4.89 |
| 925 | 3.8 – j3.9 | 3.49 + j4.72 |
| 942 | 3.6 – j4.2 | 3.06 + j4.46 |
| 960 | 3.6 – j4.7 | 3.29 + j4.04 |
| BLP8G10S-45PG | | |
| 720 | 13.2 – j7.7 | 4.34 + j5.10 |
| 746 | 11.8 – j4.6 | 4.58 + j4.94 |
| 757 | 10.4 – j3.7 | 4.50 + j5.34 |
| 791 | 9.8 – j2.5 | 4.19 + j4.87 |
| 869 | 5.0 – j4.0 | 4.27 + j3.42 |
| 881 | 4.6 – j4.2 | 3.62 + j3.45 |
| 894 | 4.2 – j4.7 | 3.77 + j3.29 |
| 925 | 3.8 – j5.6 | 3.60 + j3.15 |
| 942 | 3.7 – j5.8 | 3.29 + j2.89 |
| 961 | 3.6 – j6.4 | 3.36 + j2.47 |

[1] Z_S and Z_L defined in Figure 1.

[2] Z_L is selected for maximum efficiency.

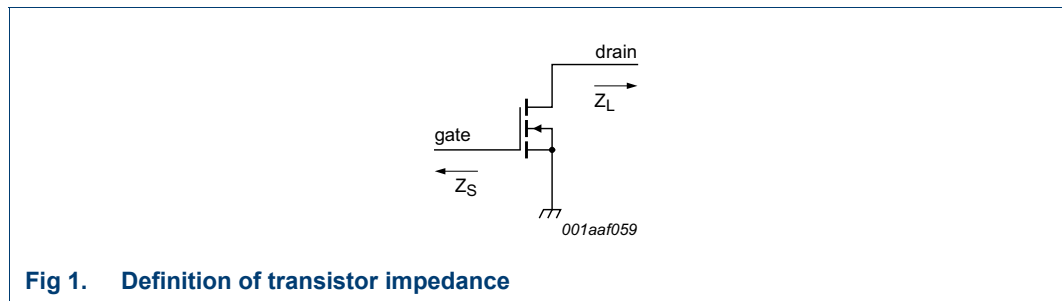


Fig 1. Definition of transistor impedance

7.3 Test circuit

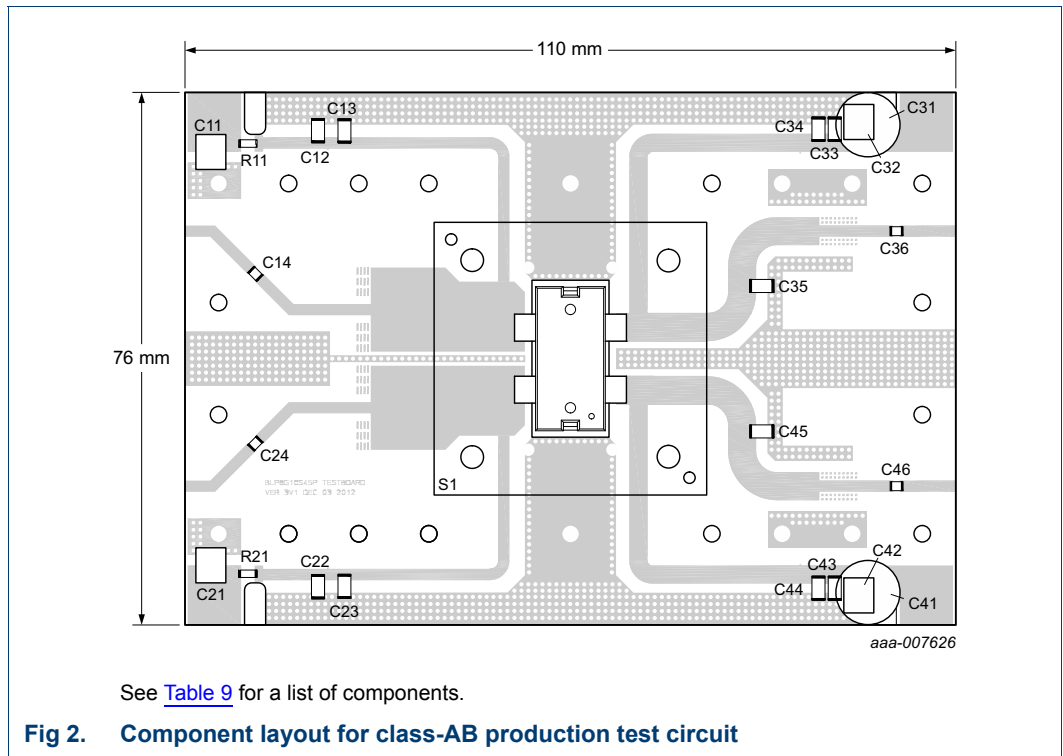


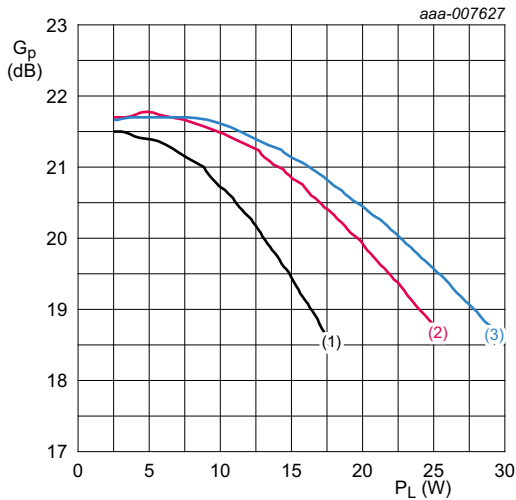
Table 9. List of components

For test circuit see [Figure 2](#).

| Component | Description | Value | Remarks |
|--------------------|-----------------------------------|-------------------|---------------------|
| C11, C21, C32, C42 | multilayer ceramic chip capacitor | 10 μ F, 50 V | |
| C12, C22, C33, C43 | multilayer ceramic chip capacitor | 1 μ F, 50 V | |
| C13, C23, C34, C44 | multilayer ceramic chip capacitor | 43 pF | ATC100B |
| C14, C24, C36, C46 | multilayer ceramic chip capacitor | 43 pF | ATC100A |
| C31, C41 | electrolytic capacitor | 220 μ F, 63 V | |
| C35, C45 | multilayer ceramic chip capacitor | 3.3 pF | ATC100B |
| R11, R21 | chip resistor | 10 Ω | Multi Comp SMD 1206 |
| S1 | socket | - | Johnstech |

7.4 Graphical data

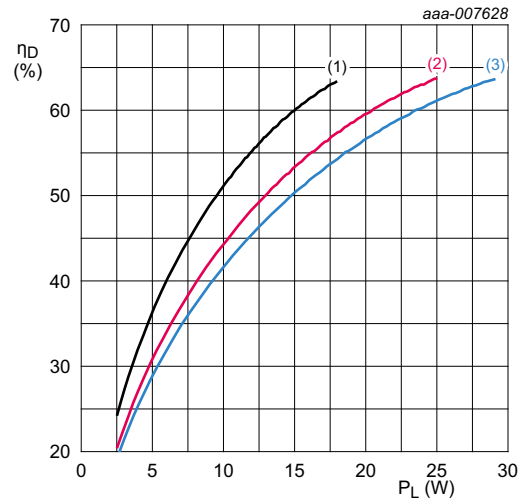
7.4.1 2-Carrier W-CDMA



$V_{DS} = 28\text{ V}$; $I_{Dq} = 224\text{ mA}$; carrier spacing = 5 MHz;
 $f_c = 960\text{ MHz}$

- (1) $V_{DS} = 24\text{ V}$
- (2) $V_{DS} = 28\text{ V}$
- (3) $V_{DS} = 32\text{ V}$

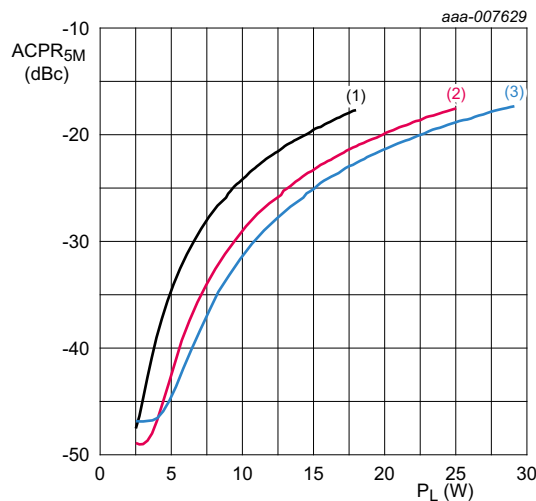
Fig 3. Power gain as a function of output power per section; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 224\text{ mA}$; carrier spacing = 5 MHz;
 $f_c = 960\text{ MHz}$

- (1) $V_{DS} = 24\text{ V}$
- (2) $V_{DS} = 28\text{ V}$
- (3) $V_{DS} = 32\text{ V}$

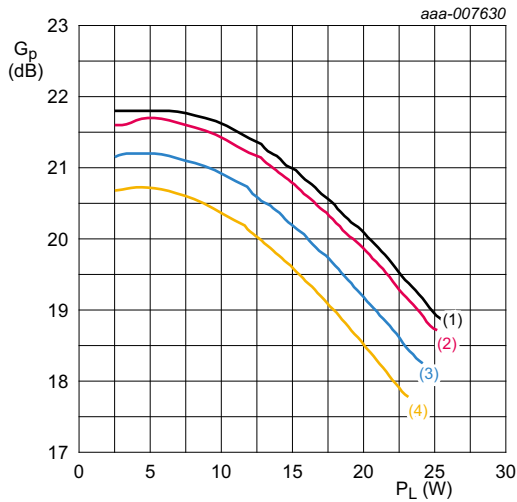
Fig 4. Drain efficiency as a function of output power per section; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 224\text{ mA}$; carrier spacing = 5 MHz; $f_c = 960\text{ MHz}$

- (1) $V_{DS} = 24\text{ V}$
- (2) $V_{DS} = 28\text{ V}$
- (3) $V_{DS} = 32\text{ V}$

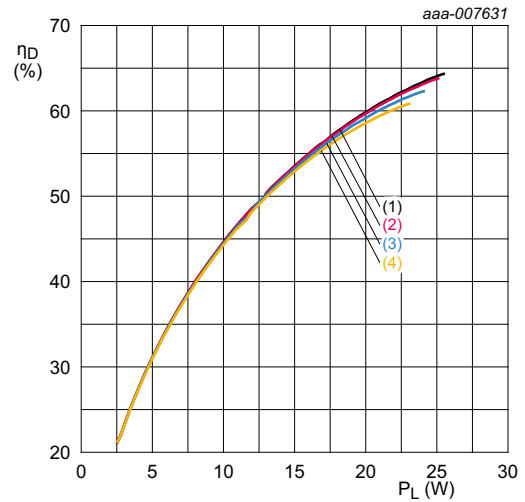
Fig 5. Adjacent channel power ratio (5 MHz) as a function of output power per section; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 224\text{ mA}$; carrier spacing = 5 MHz;
 $f_c = 960\text{ MHz}$

- (1) $T_{case} = 15\text{ }^\circ\text{C}$
- (2) $T_{case} = 25\text{ }^\circ\text{C}$
- (3) $T_{case} = 55\text{ }^\circ\text{C}$
- (4) $T_{case} = 85\text{ }^\circ\text{C}$

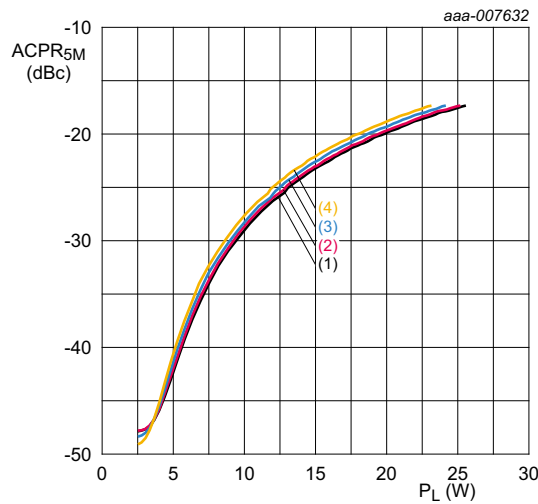
Fig 6. Power gain as a function of output power per section; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 224\text{ mA}$; carrier spacing = 5 MHz;
 $f_c = 960\text{ MHz}$

- (1) $T_{case} = 15\text{ }^\circ\text{C}$
- (2) $T_{case} = 25\text{ }^\circ\text{C}$
- (3) $T_{case} = 55\text{ }^\circ\text{C}$
- (4) $T_{case} = 85\text{ }^\circ\text{C}$

Fig 7. Drain efficiency as a function of output power per section; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 224\text{ mA}$; carrier spacing = 5 MHz; $f_c = 960\text{ MHz}$

- (1) $T_{case} = 15\text{ }^\circ\text{C}$
- (2) $T_{case} = 25\text{ }^\circ\text{C}$
- (3) $T_{case} = 55\text{ }^\circ\text{C}$
- (4) $T_{case} = 85\text{ }^\circ\text{C}$

Fig 8. Adjacent channel power ratio (5 MHz) as a function of output power per section; typical values

8. Package outline

HSOP4F: plastic, heatsink small outline package; 4 leads(flat)

SOT1223-2

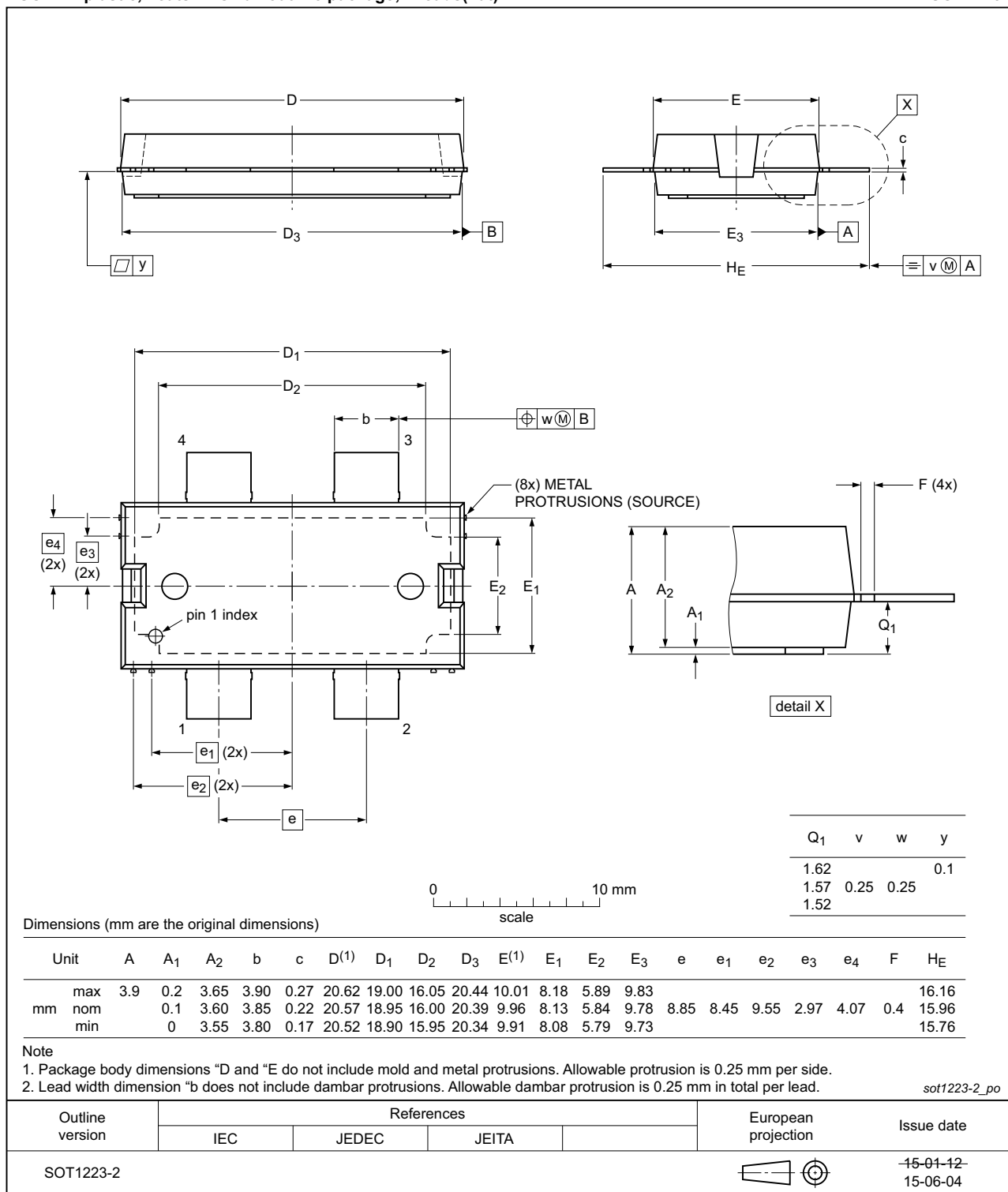


Fig 9. Package outline SOT1223-2 (HSOP4F)

HSOP4: plastic, heatsink small outline package; 4 leads

SOT1224-2

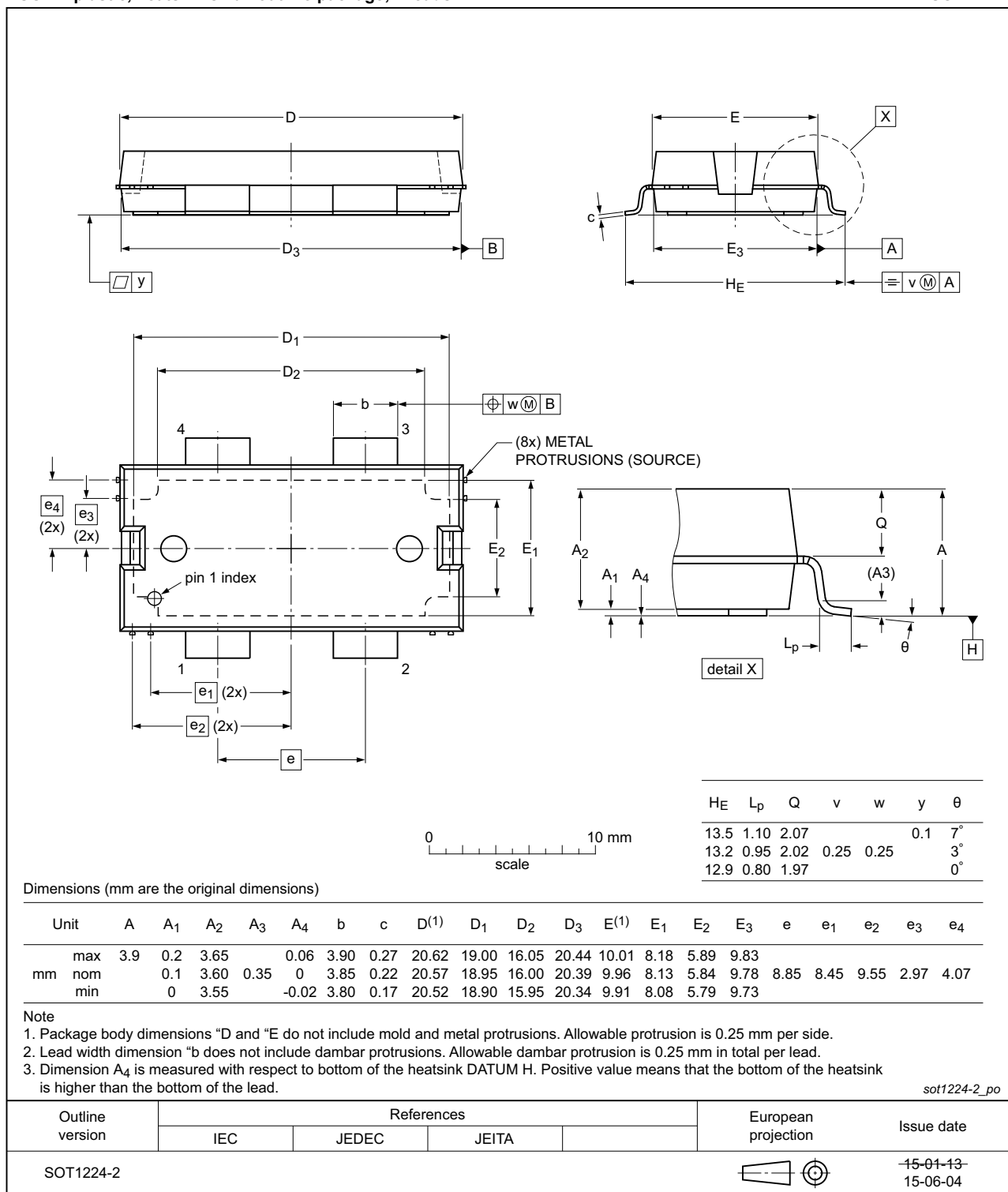


Fig 10. Package outline SOT1224-2 (HSOP4)

9. Handling information

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

10. Abbreviations

Table 10. Abbreviations

| Acronym | Description |
|---------|--|
| 3GPP | 3rd Generation Partnership Project |
| CCDF | Complementary Cumulative Distribution Function |
| DPCH | Dedicated Physical CHannel |
| ESD | ElectroStatic Discharge |
| GSM | Global System for Mobile Communications |
| LDMOS | Laterally Diffused Metal-Oxide Semiconductor |
| LTE | Long Term Evolution |
| PAR | Peak-to-Average Ratio |
| SMD | Surface Mounted Device |
| VSWR | Voltage Standing-Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |

11. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------------------|---|--------------------|---------------|-----------------------------|
| BLP8G10S-45P_8G10S-45PG v.3 | 20160108 | Product data sheet | | BLP8G10S-45P_8G10S-45PG v.2 |
| Modifications: | <ul style="list-style-type: none"> • Table 2 on page 2: table updated • Table 3 on page 2: table updated • Figure 9 on page 8: package outline changed from SOT1223-1 to SOT1223-2 • Figure 10 on page 9: package outline changed from SOT1224-1 to SOT1224-2 | | | |
| BLP8G10S-45P_8G10S-45PG v.2 | 20150901 | Product data sheet | | BLP8G10S-45P_8G10S-45PG v.1 |
| BLP8G10S-45P_8G10S-45PG v.1 | 20130725 | Product data sheet | - | - |

12. Legal information

12.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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